



Technical A-Z Glossary

A

a-Si: "Amorphous Silicon"

Active Matrix: Term used to describe LCD Displays which have micro-transistors that "open" and "close" each pixel.

Active Matrix TFT: A common type of LCD used in laptops, cameras, and LCD projection panels that were produced in the late 1980s to early 1990s. A typical active matrix TFT display is a single panel of LCD glass that controls all three primary colors. TFT displays are noted for their quick response time and their ability to display full motion video and animations without image ghosting.

Anamorphic Lens: An anamorphic lens is a lens that has different optical magnification along mutually perpendicular radii. This provides the ability to project a source image of one aspect ratio, such as 4:3, into a different aspect ratio, such as 16:9, by using different magnifications for the horizontal and the vertical dimensions of the projected image.

ANSI Contrast: Contrast is the ratio between white and black. The larger the contrast ratio the greater the ability of a projector to show subtle color details and tolerate extraneous room light. There are two methods used by the projection industry: 1) Full On/Off contrast measures the ratio of the light output of an all white image (full on) and the light output of an all black (full off) image. 2) ANSI contrast is measured with a pattern of 16 alternating black and white rectangles. The average light output from the white rectangles is divided by the average light output of the black rectangles to determine the ANSI contrast ratio. When comparing the contrast ratio of projectors make sure you are comparing the same type of contrast. Full On/Off contrast will always be a larger number than ANSI contrast for the same projector.

ANSI Lumens: A standard for measuring light output, used for comparing projectors. Unfortunately, there are enough variables, that the eye will often disagree radically with the ANSI rating. At best, ANSI lumens do fairly well comparing "apples" to "apples". If however one projector uses Halogen lamps and another metal-halide, the halogen projector will seem noticeably dimmer even if the two units rate the same. Other variables, including type of LCD technology (active matrix TFT, Poly-Si, passive), type of overall technology (LCD vs. DLP vs. CRT), contrast ratios, etc. all effect the end result.

Aperture: In television optics, it is the effective diameter of the lens that controls the amount of light reaching the photoconductive or photo emitting image pickup sensor.

Aperture Correction : Compensation for the loss in sharpness of detail because of the finite dimensions of the image elements or the dot-pitch of the monitor.

Aspect Ratio: The most popular aspect ratio is 4:3 (4 by 3). Early television and computer video formats are in a 4:3 aspect ratio, which means that the width of the image is 4/3 times the height. Examples: A 15 inch monitor is 12 inches wide by 9 inches high ($9 \times 4/3 = 12$). A resolution of 640x480 is a 4:3 format ($480 \times 4/3 = 640$). Other formats are 5:4 used by the 1280x1024 SXGA resolution, 16:9 is used by HDTV, and 3:2 for 35mm slides.

ATA Rated Case: A case rated strong enough to be shipped by common carrier; freight lines, UPS, FedEx, etc. Most cases of this type are easily recognized by their metal reinforced corners and handles. These cases are often referred to as "Anvil cases" bearing the name of one of the manufacturers.

Auto Balance : A system for detecting errors in color balance in white and black areas of the picture and automatically adjusting the white and black levels of both the red and blue signals as needed for correction.

B

Back Room Projector: A projector with a "long-throw" lens designed to be used from the far back of the room, often in a projection booth, balcony, or back of an auditorium. Many typical projectors have third party lenses available for "long-throw" applications.

Backlit: Refers to a remote control, or on projector control panel, that has buttons and controls that are illuminated. This is a major asset when using the projector in a darkened or semi-darkened room. Many projectors have backlit remote controls, while the number of projectors with backlit control panels is much smaller. As projectors have gotten brighter, room lights tend to stay on, so while nice, having backlit controls is no longer important to many users.

Bandwidth: The number of cycles per second (Hertz) expressing the difference between the lower and upper limiting frequencies of a frequency band; also, the width of a band of frequencies.

Brightness: The attribute of visual perception in accordance with which an area appears to emit more or less light. (Luminance is the recommended name for the photo-electric quantity which has also been called brightness.)

C

Carry-on Case: Refers to a projector with carrying case that fits into the overhead bin or under the passenger seat of an airline. A projector case that does not fit these conditions will need to be checked as luggage, and ride in the cargo area of the airline. Make sure you have a good hard case when checking a projector as luggage. A projector is a delicate device that can have its LCDs misaligned when not handled properly.

Chromatic Aberration: An optical defect of a lens which causes different colors or wave lengths of light to be focused at different distances from the lens. It is seen as color fringes or halos along edges and around every point in the image.

Chromaticity: The color quality of light that is defined by the wavelength (hue) and saturation. Chromaticity defines all the qualities of color except its brightness.

Chrominance: A color term defining the hue and saturation of a color. Does not refer to brightness.

Coated Optics: A variety of materials are put on to high quality lenses for several reasons. One of the key reasons is to minimize the amount of light reflected back to the lamp, and the amount of ambient light that mingles with the focused light leaving the lens. Generally good coatings can add 15% or more to the lenses brightness. Other coatings are used for filtering colors/

Color Dynamics: "The whitest whites, reddest reds, etc." High color dynamics are a result of dynamic range/contrast ratio's. When we describe a unit as having excellent color dynamics, the practical description might be "rich colors, excellent definition, high contrast".

Color Temperature: A method of measuring the "whiteness" of a light source. Metal halide lamps have very high temperatures compared to halogen or incandescent lights.

Component Video: Component Video is a method of delivering quality video (RGB) in a format that contains all the components of the original image. These components are referred to as luma and chroma and are defined as Y'Pb'Pr' for analog component and Y'Cb'Cr' for digital component. Component video is available on some DVD players and projectors.

Composite Video Signal: The combined picture signal, including vertical and horizontal blanking and synchronizing signals.

Compressed Resolution: Most projectors automatically accept images that are of greater resolution than the native (true) resolution of the projector. The resulting image is scaled to fit the native resolution of the projector using a variety of scaling algorithms. Not all projectors use the same compression algorithms; therefore, the quality of compression can vary. The nature of compression in a digital device means that some image content is lost.

Compressed SVGA: Unlike CRT based monitors, LCD and DLP projectors only have one "true" resolution. Most projectors out there are VGA (640x480) resolution. To project an 800x600 image to a VGA projector, the original 800x600 signal must be compressed down to VGA. This is done by interpolating the data, and trying to best display all the information with only two thirds of the pixels (307,000 vs 480,000). The resulting image gives you the SVGA page size, but some sacrifice of image quality. For the vast majority of people with SVGA laptops or desks, they will have more satisfying results, outputting VGA to a VGA projector.

Compressed SXGA: Found on XGA projectors, compressed SXGA handling allows these projectors to handle up to 1280x1024 SXGA resolution. Most owners of XGA projectors that use the compressed SXGA are workstation users (SUN, SGI, IBM, HP...) The typical uses for these workstations are medical, life sciences, engineering and so on.

Compressed XGA: Found on SVGA projectors, compressed XGA handling allows these projectors to handle 1024x768 XGA resolution. How good the compressed XGA is on a given model is a key factor in the decision process for most people choosing an SVGA projector. This is true as the market shifts from SVGA laptops to those with XGA screens.

Contrast Ratio: The ratio between white and black. The larger the contrast ratio the greater the ability of a projector to show subtle color details and tolerate extraneous room light. There are two methods used by the projection industry: 1) Full On/Off contrast measures the ratio of the light output of an all white image (full on) and the light output of an all black (full off) image. 2) ANSI contrast is measured with a pattern of 16 alternating black and white rectangles. The average light output from the white rectangles is divided by the average light output of the black rectangles to determine the ANSI contrast ratio. When comparing the contrast ratio of projectors make sure you are comparing the same type of contrast. Full On/Off contrast will always be a larger number than ANSI contrast for the same projector.

D

dB: dB or decibel, is a measure of the power ratio of two signals. In system use, a measure of the voltage ratio of two signals, provided they are measured across a common impedance.

Diagonal Screen: A method of measuring the size of a screen or a projected image. It measures from one corner to the opposite corner. A 9FT high, 12FT wide, screen has a diagonal of 15FT. Throughout this document we assume that the diagonal dimensions are for the traditional 4:3 ratio of a computer image as per the example above. Some screens are square, others particularly wide for 35mm slides 3:2 ratio. As such even if the screen is 12x12, we would rate it 15FT diagonal since that would be the diagonal of the usable area. OK, how about this! Remember high school? Here's your old geometry lesson. X-squared times Y-squared equals Z-squared. 3ft by 4ft screen = 3 squared (9), + 4 squared (16), equals 25 (5 squared) a 5 ft diagonal image.

Dichroic: A mirror or lens that reflects or refracts selective wavelengths of light. Typically used in projector light engines to separate the lamps "white" light into red, green, and blue light.

Digital Light Processing (DLP): The commercial name for this technology from Texas Instruments (TI): The technology inside is often referred to as either "micro-mirrors", or DMD: It works this way: build a few hundred thousand tiny mirrors, and line them up in 800 rows of 600 mirrors each. Now attach a hinge to each of those 480,000 mirrors. Attach each of those 480,000 hinges to its own very tiny motor! Power each motor with electrostatic energy! The motors tilt their mirrors up to 20 degrees at incredible speeds. This allows the mirrors to modulate light from a lamp, and send the "modulated signal" out through a lens, on to a screen. The most amazing part of DLP micro mirrors, is the scale of size. The 480,000 mirrors (actually 580,000 are used), hinges and motors are packed onto a "wafer" a bit larger than your thumbnail.

Distribution Amplifier: An amplifier used to maintain a clean noise free signal to the projector over significant distances. Even with good heavily shielded cables, range of video and computer signals is limited to a few dozen feet before noticeable degradation. In ceiling mount situations, where the wiring may pass along side or across electrical conduits, etc. a distribution amp may be needed with shorter distances. Many distribution amps can also split the signal into 2 or more amplified signals for driving multiple projectors, projectors and monitors.

Dual Scan Passive Matrix: Newer version of the original passive matrix technology, where the screen is controlled by two processing systems. A bit faster than "single scan," response is still horrendously slow, they cannot do multimedia or video either. Contrast remains terrible. Dual scan is used in the least expensive LCD panels.

DVI: DVI means Digital Visual Interface. DVI is a standard that defines the digital interface between digital devices such as projectors and personal computers. For devices that support DVI, a digital to digital connection can be made that eliminates the conversion to analog and thereby delivers an unblemished image. Specifications on DVI are available at www.ddwg.org.

F

Fader: The control on a projector, that allows you to control the balance of sound between the projectors internal speakers and the external speakers (PA, powered speakers). Only a couple of projectors offer this convenient feature.

Field: One of the two equal but vertically separated parts into which a television frame is divided in an interlaced system of scanning. A period of 1/60 second separates each field start time.

FM Based Remote: A remote control that broadcasts its instructions with an FM transmitter, normally required in large rooms, thanks to long range, and no line of site requirement.

Focal Length: The distance from the surface of a lens to its focal point.

Form Factor: A general description a major feature or features that identify a type of projector or category of capabilities. Example: The Epson's form factor is considered the classic road warrior machine; weight under 17 lbs, zoom lens for easy placement, enough brightness to handle a darkened auditorium, and small enough to be moved easily and qualify as carry-on luggage, even in its hard case.

Front Room Projector or Position: A unit that sits close to the screen, its short throw lens projects an image size that is about the same as the distance to the screen. 6FT diag. screen = 6FT distance. Generally the unit might be as close as 3/4 the screen size or as far as 1.2 times image size.

Full On/Off Contrast: Contrast is the ratio between white and black. The larger the contrast ratio the greater the ability of a projector to show subtle color details and tolerate extraneous room light. There are two methods used by the projection industry: 1) Full On/Off contrast measures the ratio of the light output of an all white image (full on) and the light output of an all black (full off) image. 2) ANSI contrast is measured with a pattern of 16 alternating black and white rectangles. The average light output from the white rectangles is divided by the average light output of the black rectangles to determine the ANSI contrast ratio. When comparing the contrast ratio of projectors make sure you are comparing the same type of contrast. Full On/Off contrast will always be a larger number than ANSI contrast for the same projector.

FXL: The most popular halogen lamp in use in lower cost projectors and overhead projectors. The lamps typically last about 40 hours, however for convenience, most projectors using halogen lamps carry a spare, and a quick method of going to the backup lamp. Metal halide lamps and UHP lamps are used in most of the medium and higher priced, more powerful portables.

H

Halogen Lamps: Used in most low and medium priced projectors, these lamps last about 40 hours, with constant output throughout their life. Although halogens look very white compared to a normal incandescent lamp, they are not as white as metal halide units. Cost of operation: Under \$0.50 per hour. Most projectors using halogen lamps carry a spare lamp inside.

Hard Wired Remote: Generally a remote control is wireless, and uses infra-red transmitter. There are situations where this is not practical: Large rooms where the speaker is 35 ft or more from the projector. Rear projection, where the screen will pass some signal, but normally has the presenter pretty much tied down. Also, the presenter has to point the remote "at" the projector which often means turning away from the audience. A couple of projectors (Epson for one) offer wireless remotes that will accept a cable (hard wiring) back to the projector, assuring range and signal getting through.

High Gain Screen: A screen that uses one of many methods to collect light and reflect it back to the audience, which dramatically increase the brightness of the image over a white wall or semi-matte screen. Technologies used include curved screens, special metal foil screens (some polarized), and certain glass bead screens. Prices and performance vary tremendously, but attention to the screen can make a big difference, particularly in "tough" environments such as trade shows.

I

Infra-red Remote: The traditional remote control, it transmits infra-red, like a television remote. Typical range is limited to 30 or 35 feet. Infra-red requires line of sight or a bounce off of a hard surface. The presenter must pay attention to where the remote is pointed. Some projectors have a IR sensor in both the front and rear of the projector, which can help a bit. When working at or near the maximum distance pointing right at the receiver is necessary. Remember "line of sight" - a person's head, directly between your remote and the projector may be enough to render it unusable. FM (radio frequency remote mousing systems, by comparison, have two distinct advantages, no line of sight requirement, and longer range.

International Power Supply: A unit that can operate under a international selection of power requirements. The specs of units vary widely, but the minimum is 105-230 volts, and 50-60 cycles AC (alternating current). If you see a specification like 110v, 220v instead of a range, those ratings are usually +/- a given percent such as 10%. Some units are "self-switching" they will automatically switch to whatever power source you plug it into. Others will have to be switched (internally or externally to accommodate a difference voltage or cycle range.

Invert Image: Invert image flips the image from top to bottom, to compensate for ceiling mounting a projector upside down. Projectors typically ceiling-mount upside down, because most have "keystone" correction built in to compensate for the distortion created by "pointing up" from the table to the screen. Usual positioning has the projector about even with the bottom of the screen in a "table position," or, even with the top of the screen when ceiling mounted.

IR Communication Standard: Many new laptops have an Infra-Red transceiver that follow a recent standard for wireless communicating with peripherals (new laser printers complying with the standard) and networks or desktop systems. If you have a laptop like this, you know the pleasure of walking into a room with a configured laser printer, and printing out documents without having to "plug-in." Only a couple of projectors are now shipping that follow this standard. This allows their remote controls to talk directly to your laptop for remote mousing. A tremendous new capability, as you are normally much closer to your computer than the projector in medium or large rooms.

K

Keystone Correction: Using optics design or other methods to apply a "negative" keystone to the image, which will partially cancel the effects of keystone. If you aim a projector with keystone correction at a screen with the lens level with the middle of the screen, you will not notice that the image at the bottom is wider than at the top. When the projector is in normal position, pointing upward 10-25 degrees, the resulting image is fairly rectangular.

Keystoning: Keystoning is caused when the projected image is not perpendicular to the screen, making the top and bottom of the image different lengths.

L

Laser Pointer: A small pen or cigar sized pointer, that contains a small battery powered laser, which can project a small, red (typically), high intensity beam of light that is immediately very visible on the screen. Excellent for pointing to objects or text, to make a point.

LCD: LCD stands for liquid crystal display and comes in many forms, sizes, and resolutions. Its primary purpose is to present a digital image for viewing. A common use of LCDs is as a display on a notebook computer.

Lens Shift: The Lens Shift feature of a projector allows the optical lens to be physically shifted up and down (Vertical) or left and right (Horizontal). Most all lens shift mechanisms are motorized with vertical lens shift being the most popular. With a projector that has lens shift you can optically correct for keystone distorted images. It is also used to help geometrically align images when stacking projectors.

Long Throw Lens: A lens designed for projection from the back of a room, or rather the back of a long room. Long throw lenses would be used a projection booth in the back of a theater, etc. A typical long throw lens might have to be 50 to 100 FT back to project a 10FT diagonal image.

Lux: A standard for measuring light, numbers provided by manufacturers usually do not provide necessary additional information to compare one product to another.

M

Maximum Distance: Sometimes, rarely, the distance from the screen that a projector can focus the image. Most of the time, it is the manufacturer's opinion of how far from a screen the projector can be to cast an image that is useable (bright enough) in a fully darkened room. Generally this is very subjective. One projector might quote a distance that allows them to produce a 25FT diagonal image, while another, brighter projector might quote a distance that only equates to a 20FT image. Beware!

Maximum Image Size: The largest image a projector can throw in a darkened room. This is usually limited by focal range of the optics.

Menu Driven: Refers to the type of controls on a projector. A typical menu driven system, will first offer a menu of major categories such as Computer, Video, Audio, Display, Options. After selecting Computer, you will get another menu of choices with items like brightness, contrast, number of colors, color balance, sync. Select one of those and you can then adjust it. Many projectors which are menu driven, also offer the most widely used functions in a non-menu fashion, such as have separate buttons on the remote for volume, brightness, and contrast, as well as switching between channels/sources.

Metal Halide Lamp: The type of lamp used in many medium and all high end portable projectors. These lamps typically have a "half-life" of 1000-2000 hours. That is they slowly lose intensity (brightness) as they are used, and at the "half-life" point, they are half as bright as when new. These lamps output a very "hot" temperature light, similar to mercury vapor lamps used in street lights. Their whites are "extremely" white (with slight bluish cast.) and make Halogen lamp's whites look very yellowish by comparison.

Mid Room Projector: Designed to sit not too close or far from the screen, for a 10FT screen, typical placement is 12.5 to 25FT away. Most mid-room projectors have zoom lenses.

Minimum Distance: The closest position that a projector can focus an image onto a screen.

N

NTSC: The United States broadcast standard for video and broadcasting. An older standard and lower resolution than systems used in most of the world.

O

OHP: The common abbreviation for overhead projector.

Overhead Projector (OHP): A device consisting of a light source, a transmissive or reflective platform, and a focusable lens assembly. An OHP is designed to project images from transparencies onto a screen. LCD projection panels are designed to be used with transmissive OHPs and work best with OHPs that produce at least 3,000 lumens. Since 5% to 10% of the light that shines through an LCD panel gets onto the screen, a 3000 lumen OHP will produce an image of 150 to 300 lumens. Transmissive OHPs are fairly bulky (bigger than many projectors). Reflective OHPs are fairly portable but are not useful with LCD projection panels.

P

PAL: A European and international broadcast standard for video and broadcasting. Higher resolution than NTSC.

Panel: Also known as a projection panel, LCD projection panel, or plate. The panel is the predecessor of today's projectors. It is slightly larger and heavier than a notebook computer and the LCD it uses to produce an image is very similar to that of the notebook computer. Because panels lack their own light source, they are designed to sit on top of a transmissive overhead projector (OHP). (See the definition of Overhead Projector for lumen performance.) Because of its small size, low cost, and versatility, panels have been a popular solution for education applications where an OHP is frequently available in the classroom for other instructional purposes. A few products have been built that integrated the panel and the OHP. These were some of the earliest projectors.

PanelLink: An all digital interface used to transmit computer video from a PC/Notebook to a projector. Supports resolutions from 640x480(VGA) up to 1600x1200(UXGA). This digital interface might someday replace the analog VGA interface typically used to connect projectors to computers.

Passive Matrix LCD: The original LCDs, these are controlled by a single processing system, for the whole screen, unlike active and poly-si, which have discrete circuits for each "pixel." This results in a panel with terrible color dynamics and contrast (typically 15:1). They are also incredibly slow: On passive laptop computers, the cursor (or anything else) moving on the screen, goes invisible until you stop moving it (submarining) Only one or two projectors use any type of passive matrix display.

Poly-Si (silicon) LCD: A popular LCD technology for the majority of the line LCD projectors. Monochrome Poly-Si LCDs are typically placed in each of the three color light paths inside a projector, one each for Red, Green, and Blue. This results in increased color saturation, with contrast ratios above 200:1. Poly-Si technology is also a bit faster than the Active Matrix TFT, for smooth video and multimedia.

Power Zoom : A zoom lens with the zoom in and out controlled by a motor, usually adjusted from the projector's control panel and also the remote control.

Projector: A projector is a device that integrates a light source, optics system, electronics and display(s) for the purpose of projecting an image from a computer or video device onto a wall or screen for large image viewing. There are hundreds of products available in the market and they are differentiated by their resolution, performance and features. These devices are attached to a computer or video device as you would connect a monitor.

Q

QXGA: QXGA is used to define a specific display resolution. Resolution is defined by the number of individual dots that a display uses to create an image. These dots are called pixels. A QXGA display has 2048 horizontal pixels and 1536 vertical pixels giving a total display resolution of 3,145,728 individual pixels that are used to compose the image delivered by a projector. A QXGA display has 4 times the resolution of an XGA display.

R

Rear Screen Projection: Using an opaque screen, the projector is placed behind the screen, invisible to the audience. It projects onto the screen and the audience sees it on the other side. Good rear projection screens actually produce brighter images than some standard screens. So as not to waste space behind the screen, ideally a projector with a short throw lens is used. Since the projector can be placed even with the middle of the screen, without blocking anyone's view, keystoneing is not a problem. Some mid-room projectors like the Epson have available 3rd party short throw lenses. Since the image is projected through the screen, the image must be reversed.

Reverse Image: Reverse image is a feature found on most projectors which flips the image horizontally. When used in a normal forward projection environment text, graphics, etc, are backwards. Reverse image is used for rear projection.

RGB: Red, Green, Blue; the normal type of monitor used with computers, examples of usage: RGB input or output often referred to as Computer input or output.

S

S-Video: A video transmission standard that uses a 4 pin mini-DIN connector to send video information on two signal wires called luminance(brightness, Y) and chrominance(color, C). S-Video is also referred to as Y/C. A composite signal, typically found coming out of an RCA jack on the back of most VCRs has the Y and C information combined into one signal. The advantage of having luminance and chrominance separated is that a comb filter is not needed inside the video projector to separate the composite signal into the luminance and chrominance signals. A comb-filter can reduce the sharpness of your video image.

SECAM: A French and international broadcast standard for video and broadcasting. Higher resolution than NTSC.

Short Throw Lens: A lens designed to project the largest possible image from short distance. Most front room projectors use short throw lens. They are often required for rear projection, where the depth behind the screen is limited. A typical short throw lens might produce a diagonal image size of 10 FT, from a distance of 7 to 10 FT.

SVGA: SVGA is used to define a specific display resolution. Resolution is defined by the number of individual dots that a display uses to create an image. These dots are called pixels. An SVGA display has 800 horizontal pixels and 600 vertical pixels giving a total display resolution of 480,000 individual pixels that are used to compose the image delivered by a projector.

SXGA: SXGA is used to define a specific display resolution. Resolution is defined by the number of individual dots that a display uses to create an image. These dots are called pixels. An SXGA display has 1280 horizontal pixels and 1024 vertical pixels giving a total display resolution of 1,310,720 individual pixels that are used to compose the image delivered by a projector.

T

TFT: Thin Film Transistor

U

UXGA: UXGA is used to define a specific display resolution. Resolution is defined by the number of individual dots that a display uses to create an image. These dots are called pixels. A UXGA display has 1600 horizontal pixels and 1200 vertical pixels giving a total display resolution of 1,920,000 individual pixels that are used to compose the image delivered by a projector

V

VGA: VGA is used to define a specific display resolution. Resolution is defined by the number of individual dots that a display uses to create an image. These dots are called pixels. A VGA display has 640 horizontal pixels and 480 vertical pixels giving a total display resolution of 307,200 individual pixels that are used to compose the image delivered by a projector.

W

WSXGA: WSXGA defines a class of SXGA displays with a width resolution sufficient to create an aspect ratio of 16:9. Resolution is defined by the number of individual dots that a display uses to create an image. These dots are called pixels. A WSXGA display has 1920 to 1600 horizontal pixels and 1080 to 900 vertical pixels respectively that are used to compose the image delivered by the projector.

WXGA: WXGA defines a class of XGA displays with a width resolution sufficient to create an aspect ratio of 16:9. Resolution is defined by the number of individual dots that a display uses to create an image. These dots are called pixels. A WXGA display has 1366 to 1280 horizontal pixels and 768 to 720 vertical pixels respectively that are used to compose the image delivered by the projector.

X

XGA: XGA is used to define a specific display resolution. Resolution is defined by the number of individual dots that a display uses to create an image. These dots are called pixels. An XGA display has 1020 horizontal pixels and 768 vertical pixels giving a total display resolution of 783,360 individual pixels that are used to compose the image delivered by a projector.

Z

Zoom Lens: A lens with a variable focal length providing the ability to adjust the size of the image on a screen by adjusting the zoom lens, instead of having to move the projector closer or further.

Zoom Lens Ratio: Is the ratio between the smallest and largest image a lens can projector from a fixed distance. For example, a 1.4:1 zoom lens ratio means that a 10 foot image without zoom would be a 14 foot image with full zoom. Conversely, a 10 foot diagonal image at 15 feet with no zoom would still be a 10 image at 21 feet at maximum zoom ($15 \times 1.4 = 21$ feet). A zoom lens is "not as bright" as a fixed lens, and the higher the ratio, the less light output.